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| 10/797,650 | 03/09/2004 | Aki Tomita | 16869K-109000US | 4199 |

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EXAMINER

VO, THANH DUC

ART UNIT PAPER NUMBER

2189

DATE MAILED: 02/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/797,650 | Applicant(s) TOMITA, AKI | |
| | Examiner Thanh D. Vo | Art Unit 2189 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 November 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 11-19 is/are rejected.
- 7) ☒ Claim(s) 8-10 and 20 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 04 November 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☒ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date: _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date: _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office Action is responsive to the Amendment filed on November 4, 2005. Claims 1-8, 12, 13, and 15-19 have been amended. Claims 1-20 are again presented for examination.

Claims 1-20 are pending.

Response to Arguments

Applicant's arguments with respect to claims 1-20 under 35 U.S.C. 102(b) have been considered but are moot in view of the new ground(s) of rejection. The rejections are as follow.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 2 and 3 (amended) depend on claim 1 recite the limitation "the S-VOL group read-only" (page 2), "the/said Read-only (RO) S-VOL" (page 2 and 3). There are insufficient antecedent basis for these limitations in the claims.

Examiner respectfully request the Applicants to further examine the subsequent claims 4-7, and 13-19 for the following limitations that are lacking of antecedent basis in the claims: (a) "said S-VOL group read-only"; (b) "the Read-only (RO) S-VOL(s)", (c) "said/the RO S-VOL", (d) "the S-VOL group read-only", (e) "the S-VOL group read-and-write", and (f) "the RW S-VOL".

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Deriving from lacking of the antecedent basis in claims 2-7, and 13-19, claims 2-7, and 13-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

For example, claim 2 contains the phrase: "wherein said controller further includes an access management unit configured to render at least one of **said S-VOLs belonging to the S-VOL group read-only**". In this phrase, **said S-VOLs belonging to the S-VOL group read-only** is indefinite since it does not particularly point out or distinctly claim the subject matter as if the access management unit configured to render at least one of said S-VOLs belonging to the S-VOL group to be read-only or to render at least one of said S-VOLs belong to a read-only S-VOL group.

Applicant respectfully requests the applicant to make clear and correct any 35 USC 112 rejections above.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, and 11-14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ofek et al (U.S. 5,889,935)

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As to amended claims 1 and 12, Ofek et al ('935) disclose an I/O system and method comprising:

- a. a plurality of storage devices (see Fig. 1 item 22a-c, and col. 6 lines 20-29).
- b. a controller which controls said storage devices (see Fig. 1 item 16, and col. 6 lines 20-29).
- c. a read/write unit, responsive to the subsequent receipt of a read and write requests (Fig 1. item 30 and 66, and col. 8 lines 4-9).
- d. a logical volume management unit configured to map between logical image of the data storage and actual space (col. 13 lines 25-41).
- e. a volume management unit configured to manage an active primary volume and **secondary mirror volumes group** (Fig. 1, item 48) **including multiple secondary volumes** (Fig 1, items 50a and 50b, and col. 9 lines 25-32).
- f. a restoring unit configured to restore the data of a first S-VOL (50a or R1) **belonging to the S-VOL group** with the data of the second S-VOL (50b or R2) **belonging to the S-VOL group** as an error occurs (col. 23 lines 23-25, and col. 24-26).

As to amended claims 2, 3, 13, and 14, Ofek et al ('935) disclose an I/O system and method comprising:

- a. an access management unit configured to set/render a S-VOL belonging to the S-VOL group **to be** read-only (col. 23, and col. 24 lines 0-10).

b. the restoring unit recovers an S-VOL (R1) **belonging to the S-VOL group** by copying the data of the Read-only (RO) S-VOL to said S-VOL **as an error happens in said S-VOL** (col. 23 lines 23-35, and col. 24, lines 1-12).

As to claim 11, Ofek et al ('935) disclose an I/O system comprising:

- a. storage devices are disk drives (Fig. 1 item 20, and Fig. 4 items 223a-d)
- b. a communicating adapter with a data processing system including read and write requests (Fig. 1 items 30 and 66, and col. 8 lines 4-9).

4. In respond to the Applicant counsel's remarks:

Applicants argued in respect to claim 1 and 12 that (a) Ofek et al. does not teach or suggest a secondary mirror volume (S-VOL) group including multiple S-VOLs created as mirror volume (S-VOL) group including multiple S-VOLs created as mirror images of said primary volume, and an S-VOL restoring unit configured to restore the data of a first S-VOL belonging to the S-VOL group with the data of a second S-VOL belonging to the S-VOL group as n error occurs.

In fact, the primary volume in Ofek et al. invention is 50a (R1-VOL) instead of 22a as argued by the Applicants and secondary volume is 50b (R2-VOL) that are residing within the same secondary data storage system. The R1 (50a) and R2 (50b) are secondary volumes in comparison to the primary volumes (22a and 22b) in the primary data storage system, which indicated that 50a and 50b are provided for a primary volume (22a) in the primary data storage system. In the other word, the

volumes 50a and 50b are a group of secondary volumes as disclosed in Ofek et al., which corresponded to first and second S-VOLs as indicated by the applicant claimed invention.

In the Ofek et al.'s invention, as a failure occurred in the R1-VOL, the failed data of R1-VOL is stored using the data stored in R2-VOL. Therefore, it is possible to secure the data in the secondary storage system that contains the secondary volumes.

Therefore, Ofek et al. is substantially disclosed an invention where the secondary data storage system contains a group of secondary volumes (50a and 50b), wherein 50a is primary volume in respect to secondary volume 50b, that are provided for the primary storage system 14. As an error or a failure occurred in 50a, the data of 50a can be restored using the data of 50b that belongs to the secondary volume group.

Applicants further argued that **(b)** Ofek et al. discloses: a mirroring system between storage systems, wherein the data that is written into the R1-VOL is also written into the R2-VOL while the present invention discloses: if a failure occurs in an S-VOL, the failed S-VOL is restored using the data stored in another S-VOL belonging to the same group as the failed S-VOL. The limitation disclosed by Ofek et al. and the limitation that disclosed by the Applicants is irrelevant to each other therefore they are incomparable and is not considered. However, Ofek et al. clearly disclosed the failed S-VOL is restored using the data stored in another S-VOL belonging to the same group as the failed S-VOL (See **(a)**)

Claims 2-3 and 11 are depending on claim 1; therefore they stand rejected and unpatentable over Ofek et al. as to the Office Action on August 18, 2005.

In respect to independent claim 12, Applicant's remarks are directing toward the same subject matter that the Applicant claim novel in claim 1. Therefore, claim 12 is rejected under the same rationale as claim 1.

Claims 13 and 14 are depending on claim 12; therefore they stand rejected and unpatentable over Ofek et al. as to the Office Action on August 18, 2005.

Allowable Subject Matter

5. Applicant's arguments, see pages 12-14, filed November 4, 2005, with respect to claims 4-10 and 15-20 have been fully considered and are persuasive. The 35 U.S.C 103(a) rejections of claims 4-7, and 16-18 have been withdrawn.

Claims 4-10, 15-18, and 20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims while overcome the rejection(s) under 35 U.S.C 112, 2nd paragraph, set forth in this Office Action.

As to claim 4, 5, 15, and 16, although Kamiyama and relevant references found from the prior art search disclosed a method of monitoring the access frequency of a storage device that contains data blocks but they failed to disclose a method of using the access frequency as if a failure occurs in an secondary volume (S-VOL), the S-VOL is restored using a read-only secondary volume (RO S-VOL) having the lowest frequency of access of the RO S-VOL(s) belonging to the same group as the failed S-

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VOL. Therefore, claims 4, 5, 15, and 16 are allowable as in combination of the storage access frequency and the method of restoring the S-VOL using the RO S-VOL with the lowest frequency of access.

As to claims 6 and 17, although Ofek et al. disclosed a cache as a increment-volume for primary and secondary storage system but it did not disclose the method of restoring a RW S-VOL belonging to the S-VOL group by replacing the RW S-VOL with the Read-only (RO S-VOL) with the updated data from the increment-volume of the RW S-VOL.

As to claims 7 and 18, although Kamiyama and relevant references found from the prior art search disclosed a method of monitoring the access frequency of a storage device that contains data blocks but they failed to disclose a method of using the access frequency as if a failure occurs in an read-and-write secondary volume (RW S-VOL), the RW S-VOL is restored using a read-only secondary volume (RO S-VOL) having the lowest frequency of access of the RO S-VOL(s) with the updated data of the increment-volume of the RW S-VOL. Therefore, claim 7 is allowable as in combination of the storage access frequency and the method of restoring the RW S-VOL using the RO S-VOL with the updated data of the increment-volume of the RW S-VOL.

Claims 8-10 are depending on claim 7 therefore claims 8-10 are allowable.

Claims 19 and 20 are depending on claim 18 therefore claims 19 and 20 are allowable.

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6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

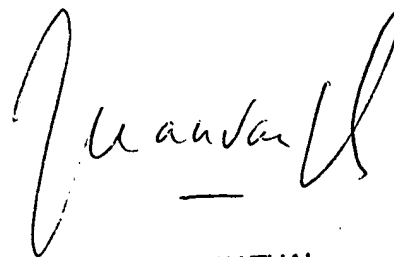
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh D. Vo whose telephone number is (571) 272-0708. The examiner can normally be reached on M-F 9AM-5:30PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thanh D Vo
Patent Examiner
1/26/2006



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